AS/NZS 4268:2017

TEST REPORT

For

Lumi United Technology Co., Ltd

Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

Test Model: PS-S03D
Multiple Models: PS-S03E

Report Type:	**Product Type:**
Revised Report	Presence Sensor FP1E

Report Number:	2402S31167-14M1
Report Date:	2024/5/30
Reviewed By:	Rocky Xiao RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) (No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China) Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY 3

General Information 4

PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 4
TECHNICAL SPECIFICATION 4
OBJECTIVE 4
TEST METHODOLOGY 4
MEASUREMENT UNCERTAINTY 5
DECLARATIONS 6

System Test Configuration 7

DESCRIPTION OF TEST CONFIGURATION 7
EQUIPMENT MODIFICATIONS 7
EUT EXERCISE SOFTWARE 7
BLOCK DIAGRAM OF TEST SETUP 7
TEST EQUIPMENT LIST 8
ENVIRONMENTAL CONDITIONS 10

Summary of Test Results 11

1 – Operating Frequency Range 12

APPLICABLE STANDARD 12
TEST PROCEDURE 12
TEST DATA 13

2 – Mean Power spectral density 14

APPLICABLE STANDARD 14
TEST PROCEDURE 14
TEST DATA 15

3 – Mean Power 16

APPLICABLE STANDARD 16
TEST PROCEDURE 16
TEST DATA 17

4 – Unwanted emissions in the out-of-band domain 18

APPLICABLE STANDARD 18
TEST PROCEDURE 19
TEST DATA 19

5 – Unwanted emissions in the spurious domain 20

APPLICABLE STANDARD 20
TEST PROCEDURE 21
TEST DATA 21

Exhibit A – Eut Photographs 22

Exhibit B – Test Setup Photographs 23

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2402S31167-14	Original Report	2024/5/27
2.0	2402S31167-14M1	Revised Report	2024/5/30

Note:
1. Remove the declaration of similarity letter;
2. Update the test equipment list;
3. Update the frequency range to 60-61GHz.

This report is to supersede the test report 2402S31167-14 which issued on 2024/5/27.

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	Presence Sensor FP1E
EUT Model:	PS-S03D
Multiple Models:	PS-S03E
Model Difference:	PS-S03D and PS-S03E have the same technical construction including circuit diagram, PCB LAYOUT, hardware version and software version identical, except sales area and packaging are different
Rated Input Voltage:	DC 5V
Serial Number:	2JP1-1
EUT Received Date:	2024/4/11
EUT Received Status:	Good

Technical Specification

Operation Frequency Range:	60-61GHz
Max. RF Output Power (EIRP):	10.23dBm
Antenna Gain▲:	5dBi
Antenna Type:	Microstrip Patch
Modulation Type:	FMCW

Objective

The report is prepared on behalf of the ***Lumi United Technology Co., Ltd*** in accordance with AS/NZS 4268:2017 Radio equipment and systems-Short range devices-Limits and methods of measurement.

The objective of the manufacturer is to determine the compliance of EUT with AS/NZS 4268:2017.

Test Methodology

All measurements contained in this report were conducted with AS/NZS 4268:2017.

According to AS/NZS 4268:2017§6.1:

6.1 General

Evidence of transmitter compliance to this Standard may be demonstrated by providing a complete ETSI or FCC test report. Australian and New Zealand requirements, for example, frequency assignments or transmitter power levels, may be different to international requirements and compliance with any differences shall be addressed and documented.

To determine compliance, a transmitter has the option of being tested to either the ETSI or FCC generic standards listed in Clause 6.2.2. Where Table 1 (in the column headed 'Test method') lists a specific ETSI product Standard for Australia, the supplier still has the option of testing to the FCC generic standard and vice versa. Refer to Figure 1 for guidance.

Where testing to an ETSI Standard or the FCC rules is permitted by this Standard (AS/NZS 4268), testing to the requirements of either of these shall be undertaken to the version(s) of the ETSI Standard published in the *Official Journal of the European Union*, or the FCC rules that apply on the date the device is imported into or manufactured in Australia or New Zealand.

According to AS/NZS 4268:2017 Clause 6.2.2 & table 1 item 71

6.2.2 *Generic Standards*

The applicable ETSI short range device Standards are as follows:

Equipment and frequency range	Method of measurement
Radio equipment 9 kHz to 25 MHz; and inductive loop systems 9 kHz to 30 MHz	ETSI EN 300 330-1
Radio equipment 25 MHz to 1000 MHz	ETSI EN 300 220-1
Radio equipment 1 GHz to 40 GHz	ETSI EN 300 440-1
Radio equipment 40 GHz to 246 GHz	ETSI EN 305 550-1

Row	Class of transmitter	Permitted operating frequency band (MHz) (lower limit exclusive, upper limit inclusive)	Maximum EIRP	Test method	Other requirements
71	Radio-determination transmitters	(a) 6 000 to 8 500 (b) 24 050 to 26 500 (c) 57 000 to 64 000 (d) 75 000 to 85 000	Limits provided in test method	ETSI EN 302 264-1	(a) Shall meet the requirements of ETSI EN 302 264-1. (b) Shall not be operated within a nominated distance of a specified Australian radio astronomy site. Refer to Note 7.

So, test method & Maximum EIRP of device meets ETSI EN 302 264 V2.1.1 (2017-05), others test item limit meets ETSI EN 302 264 V2.1.1 (2017-05)

Measurement Uncertainty

Parameter	Flab	Maximum allow uncertainty
Radio Frequency	$\pm 0.082\times10^{-6}$	$\pm 1\times10^{-7}$
Radiated RF power (up to 40 GHz)	±3.62dB	±6dB
Radiated RF power (above 40 GHz up to 66 GHz)	±4.35dB	±8dB
Radiated RF power (above 66 GHz up to 100 GHz)	±5.68dB	±10dB
Radiated RF power (above 100 GHz)	±6.33dB	/
Humidity	±5%	±5%
Temperature	±1℃	±1℃
DC and low frequency voltages	±0.4%	±3%

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Declarations

The information marked ▲ is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

This report cannot be reproduced except in full, without prior written approval of the Company.

This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

This report may contain data that are not covered by the accreditation scope and shall be marked with ★.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode, which was provided by manufacturer.

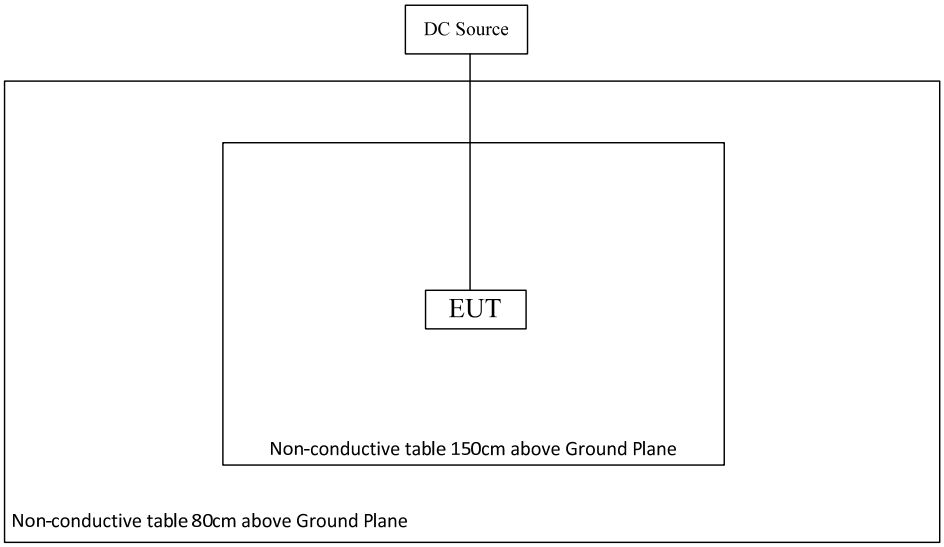
Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

No software was used.

Block Diagram of Test Setup



Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
/	/	/	/	/	/

Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RE below 1G					
Sunol Sciences	Hybrid Antenna	JB3	A060611-3	2024/1/12	2027/1/11
Wilson	Coaxial Attenuator	859936	F-08-EM014	2024/1/12	2027/1/11
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2023/7/1	2024/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2023/7/1	2024/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2023/7/1	2024/6/30
Sonoma	Amplifier	310N	372193	2023/7/1	2024/6/30
R&S	EMI Test Receiver	ESR3	102453	2023/8/18	2024/8/17
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Micro-Coax	Coaxial Cable	UFA210B	99G1448	2023/9/9	2024/9/8
Agilent	Signal Generator	E8247C	MY43321350	2023/10/18	2024/10/17
RE above 1G					
ETS-Lindgren	Horn Antenna	3115	000 527 35	2023/9/7	2026/9/6
AH	Horn Antenna	SAS-571	1177	2023/2/22	2026/2/21
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2023/2/22	2026/2/21
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-03 1304	2023/2/22	2026/2/21
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-01 1302	2023/2/22	2026/2/21
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-02 1302	2023/2/22	2026/2/21
Xinhang Macrowave	Coaxial Cable	XH750A-N/J-SMA/J-10M	20231117004 #0001	2023/11/17	2024/11/16
Xinhang Macrowave	Coaxial Cable	XH360A-2.92/J-2.92/J-6M-A	20231208001 #0001	2023/12/11	2024/12/10
Micro-Coax	Coaxial Cable	UFA210B	99G1448	2023/9/9	2024/9/8
Agilent	Signal Generator	E8247C	MY43321350	2023/10/18	2024/10/17
AH	Preamplifier	PAM-0118P	469	2023/8/19	2024/8/18
R&S	Spectrum Analyzer	FSV40	101944	2023/10/18	2024/10/17
OML	Waveguide Mixer	WR19/M19HWD	U60313-1	2023/2/16	2026/2/15
OML	Horn Antenna	M19RH	11648-01	2023/2/27	2026/2/26
Flann Micowave	Horn Antenna	24245-AB	26	2023/2/27	2026/2/26
Agilent	mm-Wave Source Modules	83556A	3138A00547	2023/2/16	2026/2/15
Agilent	Waveguide Mixer	11970V	2521A011767	2023/2/16	2026/2/15
Flann Micowave	Horn Antenna	861V/385	736	2023/2/27	2026/2/26
NSI	Horn Antenna	NSI-RF-SG15	F-08-EM195-3	2023/2/27	2026/2/26
Agilent	mm-Wave Source Modules	83557A	3942A00699	2023/2/16	2026/2/15
OML	Waveguide Mixer	WR12/M12HWD	E60120-1	2023/2/16	2026/2/15
OML	Horn Antenna	M12RH	E60120-2	2023/2/27	2026/2/26
NSI	Horn Antenna	NSI-RF-SG10	F-08-EM198-3	2023/2/27	2026/2/26
SAGE	Frequency Extender	STE-SF910-00-S2	F-08-EM198-4	2023/2/16	2026/2/15
OML	Waveguide Mixer	WR08/M08HWD	F60313-1	2023/2/16	2026/2/15
OML	Horn Antenna	M08RH	F60313-2	2023/2/27	2026/2/26
Agilent	Horn Antenna	SAZ-2410-06-S1	24449-01	2023/2/27	2026/2/26
SAGE	Frequency Extender	STE-KF1206-00-S1	24439-01	2023/9/11	2026/9/10

TDK-Lambda	DC Power Supply	Z+60-14	F-08-EM038-1	N/A	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

Test Item:	Radiated emissions below 1GHz	Radiated emissions above 1GHz
Temperature:	26.7 ℃	25.2~26.0℃
Relative Humidity:	52.0 %	42~51%
ATM Pressure:	100.1 kPa	100.8~101.2kPa
Tester:	Bill Yang	Bill Yang
Test Date:	2024/4/20	2024/4/14~2024/5/15

SUMMARY OF TEST RESULTS

S/N	Description of Test	ETSI EN 302 264 V2.1.1 VS ETSI EN 305 550-1 V1.2.1 ETSI EN 305 550-2 V1.2.1 Rules	Result
1	Operating Frequency Range	57-64GHz	Compliant
2	Peak Power	Identical	Compliant
3	Mean Power spectral density	Identical	Compliant
4	Unwanted emissions in the out-of-band domain	Identical	Compliant
5	Unwanted emissions in the spurious domain	Identical	Compliant
6	Receiver spurious emissions	Identical	Not applicable*
7	Receiver in-band, out-of-band and remote-band signals handling	ETSI EN 302 264: For 77-81GHz ETSI EN 305 550: N/A	Not applicable
8	Installation requirement	ETSI EN 302 264: For vehicular use ETSI EN 305 550: N/A	Not applicable**

Not applicable: Only for EUT operating in 77-81GHz.
Not applicable*: Not required for receivers used in combination with permanently co-located transmitters continuously transmitting.
Not applicable**: The product is not for vehicular use.

1 – OPERATING FREQUENCY RANGE

Applicable Standard

According to EN 305 550-2 section 4.2.1.3, the permitted range of operating frequencies, as defined in EN 305 550-1, clause 7.3.1, shall not exceed the limits in EN 305 550-1, clause 7.3.4.

This requirement applies to all transmitters.

Definition:

The permitted range of operating frequencies is the frequency range over which the equipment is authorized to operate.
This can also be seen as occupied bandwidth (OBW) of the device.
The permitted range of operating frequencies includes all frequencies on which the equipment may operate within an assigned frequency band. If the operating frequency range cannot be measured it shall be declared by the manufacturer.
The lowest operating frequency can be defined as fL, the highest operating frequency can be defined as fH. If the device can work in different modes and different frequency ranges this frequencies should be reported for each mode and frequency range.

Limit:

The width of the power spectrum envelope is fH - fL for a given operating frequency. In equipment that allows adjustment or selection of different operating frequencies, the power envelope takes up different positions in the allowed band. The frequency range is determined by the lowest value of fL and the highest value of fH resulting from the adjustment of the equipment to the lowest and highest operating frequencies.

The occupied bandwidth, the bandwidth in which 99 % of the wanted emission is contained, and the necessary bandwidth of the transmitter shall fall within the assigned frequency band.

For all equipment the frequency range shall lie within the frequency band given in tables 9 and 10. For non-harmonized frequency bands, the available frequency range may differ from tables 9 and 10.

Test Procedure

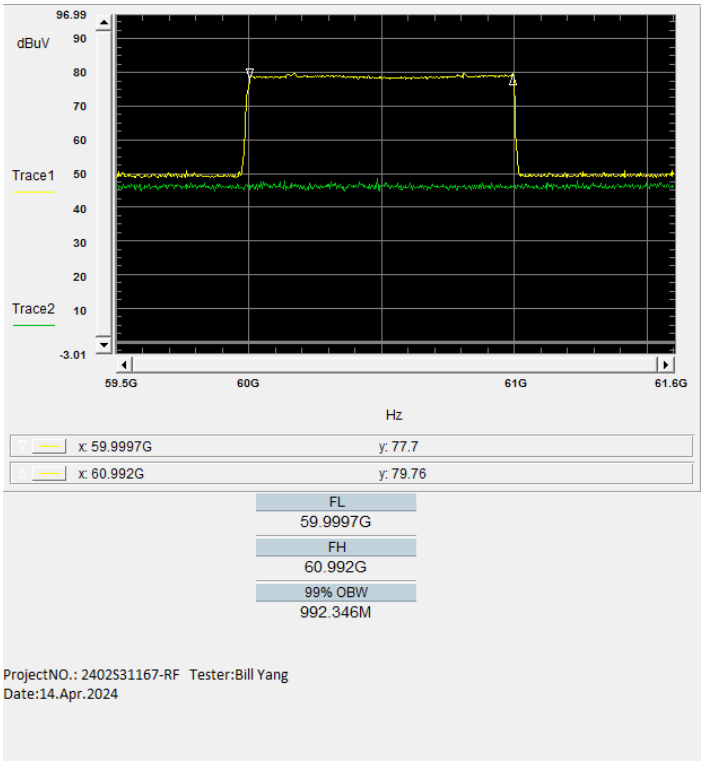
According to ETSI EN 305 550-1 V1.2.1 (2014-10) §7.2.3

Test Data

Please refer to following table:

Test Conditions	Frequency (GHz)		Frequency (GHz)	
	F_L	F_H	F_L Limit	F_H Limit
NV	59.9997	60.9920	57	64
LV	59.9999	60.9923	57	64
HV	59.9995	60.9924	57	64

The test plot for normal conditional as below:



Test Result: **Compliant**

2 – MEAN POWER SPECTRAL DENSITY

Applicable Standard

According to ETSI EN 305 550-2 section 4.2.1.1, the spectral power density applies to transmitters operating in the 57 GHz to 66 GHz frequency range.

The spectral power density, as defined in EN 305 550-1, clause 7.1.1, shall not exceed the limits in EN 305 550-1, clause 7.1.2, Table 9.

Definition:

The power spectral density is the mean Equivalent Isotropic Radiated Power (e.i.r.p) spectral density in dBm per MHz during a transmission.

Limit:

The maximum mean power spectral density is applicable to the system as a whole when operated at the highest stated power level. For a smart antenna system and directional antennas, the limit applies to the configuration that results in the highest PSD (e.i.r.p) and shall not exceed the values given in table 9.

Table 9: Mean Power Spectral Density Limit (PSD) (e.i.r.p)

Frequency Bands	Power Spectral Density	Application	Notes
57 GHz to 64 GHz	13 dBm/MHz e.i.r.p.	Non-specific SRD	
61,0 GHz to 61,5 GHz	No limit defined yet	Non-specific SRD	
122 GHz to 122,25 GHz	10 dBm / 250 MHz and -48 dBm/MHz > 30° elevation	Non-specific SRD	Notes 1, 2 and 3
122,25 GHz to 123 GHz	No limit defined	Non-specific SRD	
244 GHz to 246 GHz	No limit defined	Non-specific SRD	
NOTE 1: These limits should be measured with an rms detector and an averaging time of 1 ms or less. NOTE 2: The limit of -48 dBm/MHz applies for the normal operation mode of handheld and mobile devices and for fixed installation. NOTE 3: See for declaration requirements, clause 5.1.			

Test Procedure

According to ETSI EN 305 550-1 V1.2.1 (2014-10) §7.1.3.

Test Data

Please refer to following table:

Frequency (GHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method		Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)			
60.34	H	37.78	-49.06	24.10	-24.96	13.00	37.96
60.15	V	38.29	-48.58	24.10	-24.48	13.00	37.48

Note 1:The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
Note 2:
Absolute Level = Substituted Level + Antenna Gain
Margin = Limit- Absolute Level

Test Result: **Compliant**

3 – MEAN POWER

Applicable Standard

According to EN 305 550-2 section 4.2.1.2, the RF output power, as defined in EN 305 550-1, clause 7.2.1, shall not exceed the limits in EN 305 550-1, clause 7.2.2, Table 10.

Definition:

The RF output power is the mean Equivalent Isotropic Radiated Power (EIRP) for the equipment during a transmission burst. The mean e.i.r.p. refers to the highest power level of the transmitter power control range during the transmission cycle if the transmitter power control is implemented.

Limit:

The maximum RF output power is applicable to the system as a whole when operated at the highest stated power level. For a smart antenna system and directional antennas, the limit applies to the configuration which results in the highest EIRP.

The maximum RF output power in normal wideband operation shall be limited by usage as indicated in table 10.

Table 10: RF output power limit [i.12]

Frequency Bands	RF output power	Application	Notes
57 GHz to 64 GHz	100 mW e.i.r.p / 20 dBm e.i.r.p.	Non-specific SRD	Note 1
61,0 GHz to 61,5 GHz	100 mW e.i.r.p./ 20 dBm e.i.r.p.	Non-specific SRD	
122 GHz to 123 GHz	100 mW e.i.r.p./ 20 dBm e.i.r.p.	Non-specific SRD	Note 2
244 GHz to 246 GHz	100 mW e.i.r.p./ 20 dBm e.i.r.p.	Non-specific SRD	
NOTE 1: A max transmitter output power of 10 dBm. NOTE 2: Some countries may permit higher output power according to CEPT/ERC Recommendation 70-03 [i.1].			

Test Procedure

According to ETSI EN 305 550-1 V1.2.1 (2014-10) §7.2.3

Test Data

Please refer to following table:

Frequency (GHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method		Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)			
60.500	H	58.42	-28.39	24.10	-4.29	20.00	24.29
60.500	V	68.28	-18.56	24.10	5.54	20.00	14.46

Note 1:The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
Note 2: Absolute Level = Substituted Level + Antenna Gain
Margin = Limit- Absolute Level

Frequency (GHz)	Measure power (dBm)	Tx on（ms）	Tx on + Tx off（ms）	duty cycle	EIRP power (dBm)	Limit (dBm)
60.500	-4.29	17	50	0.34	0.40	20
60.500	5.54	17	50	0.34	10.23	20

Test Result: **Compliant**

4 – UNWANTED EMISSIONS IN THE OUT-OF-BAND DOMAIN

Applicable Standard

According to EN 305 550-2 section 4.2.1.4, the Out-of-band emissions in the Out-of-band domain, as defined in EN 305 550-1 [1], clause 7.4.1, shall not exceed the limits in EN 305 550-1 [1], clause 7.4.4, table 13.

This requirement applies to all transmitters.

Definition:

Emission on a frequency or frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious emissions.
Out-of-band emissions are measured as mean power spectral density (e.i.r.p) under normal operating conditions.
The measurement results of fH and fL will be used to determine the occupied BW of the device.
The Occupied Bandwidth (fH - fL) will be used to calculated the ranges of OOB and spurious domain.

Limit:

The boarders for the OOB and spurious domain are dependent on the Occupied Bandwidth of the EUT.
• The boarders are calculated as follows:
F1 = centre frequency of OBW [GHz] - (2,5 * (fH - fL))
F2 = centre frequency of OBW [GHz] + (2,5 * (fH - fL))
This calculation taken into account that the border between OOB and spurious will be lager/ smaller the maximum permitted range of operation (see figure 9).

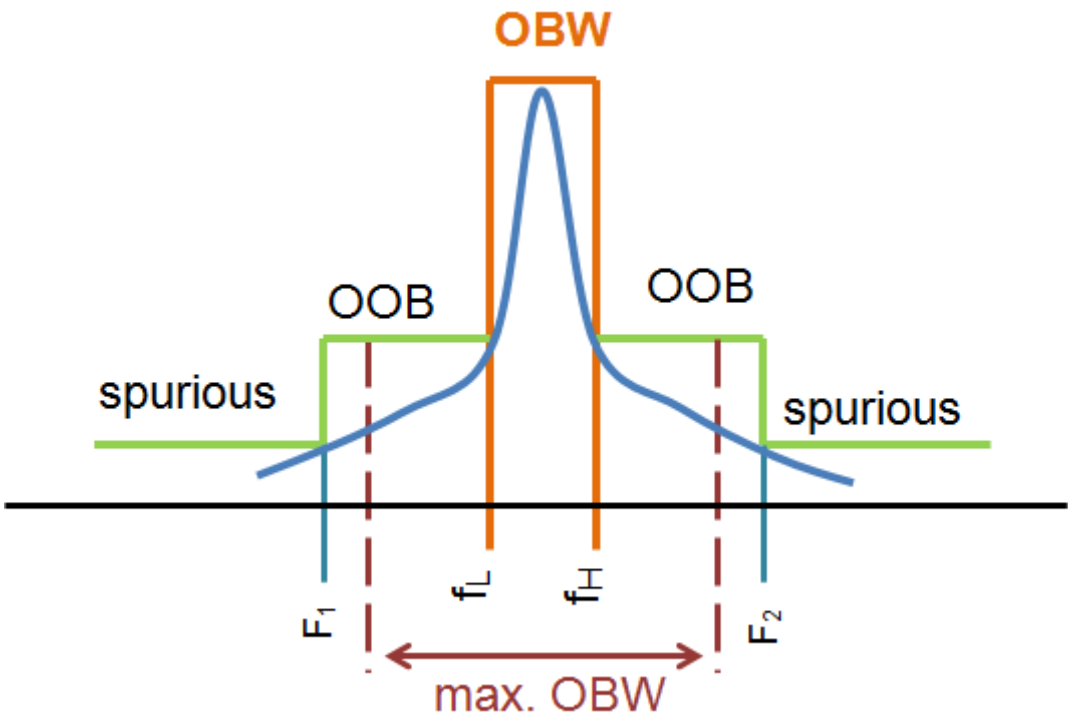


Figure 9: Overview OOB / spurious, dependent from OBW

An additional requirement introduced: if the calculated F1/F2 will be theoretical below or above the frequency which came out of the calculation based on 250 % of the maximum allowed OBW (see tables 9 and 10).
Therefore the border between OOB / spurious will be fixed at the frequencies in table 11b (normal 250 % rule based on the Centre frequency of the signal).

Table 11b: Limits for the max. F1 and F2 frequency, based on the max. theoretical OBW of the EUT

Frequency Bands	Centre frequency	Max OBW	F_1	F_2
57 GHz to 64 GHz	60,5 GHz	7 GHz	43 GHz	78 GHz
61,0 GHz to 61,5 GHz	61,25 GHz	500 MHz	60 GHz	62,5 GHz
122 GHz to 123 GHz	122,5 GHz	1 GHz	120 GHz	125 GHz
244 GHz to 246 GHz	245 GHz	2 GHz	240 GHz	250 GHz

The rms power density radiated in the calculated OOB domain (between F1 ⩽ f < fL and fH < f ⩽ F2) band shall not exceed the values shown in tables 12 and 13 [i.4].

Table 12: Out of band domain

Frequency [GHz]	rms power density [dBm/MHz]
$F_1 \leq f < f_L$	See table 13
$f_H < f \leq F_2$	See table 13

Table 13: Limits for out of band radiation

Frequency Bands	OOB limit [dBm/MHz]
57 GHz to 64 GHz	-20 dBm/MHz
61,0 GHz to 61,5 GHz	-10 dBm/MHz
122 GHz to 123 GHz	-10 dBm/MHz
244 GHz to 246 GHz	-15 dBm/MHz

Test Procedure

According to ETSI EN 305 550-1 V1.2.1 (2014-10) §7.4.3

Test Data

Please refer to following table:

Frequency (GHz)	Polar (H/V)	Receiver Reading (dBµV/MHz)	Substituted Method		Absolute Level (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBi)			
58.650	H	29.68	-57.42	24.00	-33.42	-20.00	13.42
58.160	V	30.20	-56.98	24.00	-32.98	-20.00	12.98
61.520	H	30.16	-56.49	24.10	-32.39	-20.00	12.39
61.350	V	29.86	-56.82	24.10	-32.72	-20.00	12.72

Note 1:The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
Note 2:
Absolute Level = Substituted Level + Antenna Gain
Margin = Limit- Absolute Levelel

Test Result: **Compliant**

5 – UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

Applicable Standard

According to EN 305 550-2 section 4.2.1.5, the unwanted emissions in the spurious domain, as defined in EN 305 550-1, clause 7.5.1, shall not exceed the limits in EN 305 550-1, clause 7.5.4, table 14.

This requirement applies to all transmitters.

Definition:

Emission on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.

Spurious emissions are measured as spectral power density under normal operating conditions.

According to CEPT/ERC Recommendation 74-01 and Recommendation ITU-R SM.329-12, the boundary between the out-of-band and spurious domains is ±250 % of the necessary bandwidth (OBW) from the centre frequency of the emission.

For the considered frequency bands the spurious frequency domains are:
- Frequencies f < F1 [GHz]
and
- frequencies f > F2 [GHz].
The calculations of these Frequencies is shown in clause 7.4.4, the minimum and maximum values are listed in table 11b.

Limit:

The effective radiated power of any radiated spurious emission shall not exceed the values given in table 14.

Table 14: Limits of radiated spurious emissions

Frequency range (MHz)	Limit values for spurious radiation (Measuring receiver bandwidths see table 2)	Detector type
47 to 74	-54 dBm e.r.p.	Quasi-Peak
87,5 to 118	-54 dBm e.r.p.	Quasi-Peak
174 to 230	-54 dBm e.r.p.	Quasi-Peak
470 to 862	-54 dBm e.r.p.	Quasi-Peak
otherwise in band 30 to 1 000	-36 dBm e.r.p.	Quasi-Peak
f > 1 000 to 300 000	-30 dBm e.i.r.p.	mean (see note)
NOTE: Parameter for measurement: - RBW: 1 MHz - VBW: 3 MHz - Detector: rms - Sweep time: minimum 1 radar cycle, maximum 100 ms.		

According to CEPT/ERC Recommendation 74-01, spurious emission is measured up to the 2nd harmonic of the fundamental frequency (in this case, the upper frequency limit up to which measurements are performed is 90 GHz).

The following reference bandwidths shall be used:
• 100 kHz between 30 MHz and 1 GHz;
• 1 MHz above 1 GHz.

Test Procedure

According to ETSI EN 305 550-1 V1.2.1 (2014-10) §7.5.3

Test Data

Please refer to following table:

Transmit Mode

30MHz-40GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
209.35	H	44.40	-70.88	0.00	0.18	-71.06	-54.00	17.06
322.80	V	48.35	-67.83	0.00	0.20	-68.03	-36.00	32.03
323.76	H	40.65	-73.69	0.00	0.20	-73.89	-36.00	37.89
209.45	V	45.74	-71.67	0.00	0.18	-71.85	-54.00	17.85
1326.29	H	50.26	-74.26	8.48	1.19	-66.97	-30.00	36.97
1554.57	V	50.34	-76.03	9.83	0.98	-67.18	-30.00	37.18
34347.00	H	46.20	-56.40	22.10	2.90	-37.20	-30.00	7.20
34049.00	V	45.74	-57.80	22.10	2.80	-38.50	-30.00	8.50

Note 1: The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
Note 2:
Absolute Level = Substituted Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

Above 40GHz:

Frequency (GHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method		Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBi)			
41.62	H	29.50	-60.26	24.00	-36.26	-30.00	6.26
42.59	V	27.65	-61.96	24.00	-37.96	-30.00	7.96
64.51	H	26.32	-59.87	24.10	-35.77	-30.00	5.77
64.59	V	26.84	-59.33	24.10	-35.23	-30.00	5.23
91.20	H	26.59	-62.98	24.20	-38.78	-30.00	8.78
91.65	V	28.41	-61.10	24.20	-36.90	-30.00	6.90

Note:
Absolute Level = Substituted Level + Antenna Gain
Margin = Limit- Absolute Level

Test Result: **Compliant**

EXHIBIT A – EUT PHOTOGRAPHS

For photos in this section, please refer to report No.: 2402S31167-09 EXHIBIT A.

EXHIBIT B – TEST SETUP PHOTOGRAPHS

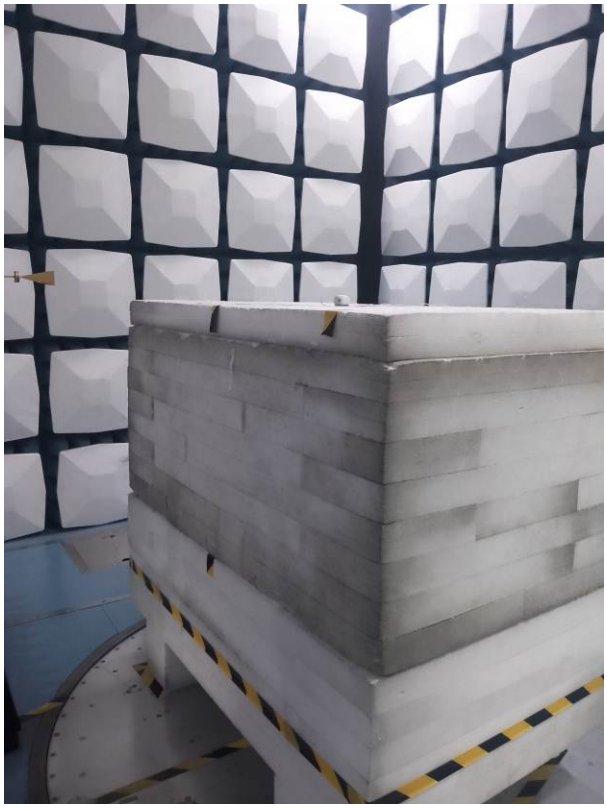
RE Below 1GHz front View

RE Above 1GHz View 1-18GHz

RE Above 1GHz View 18-26.5GHz

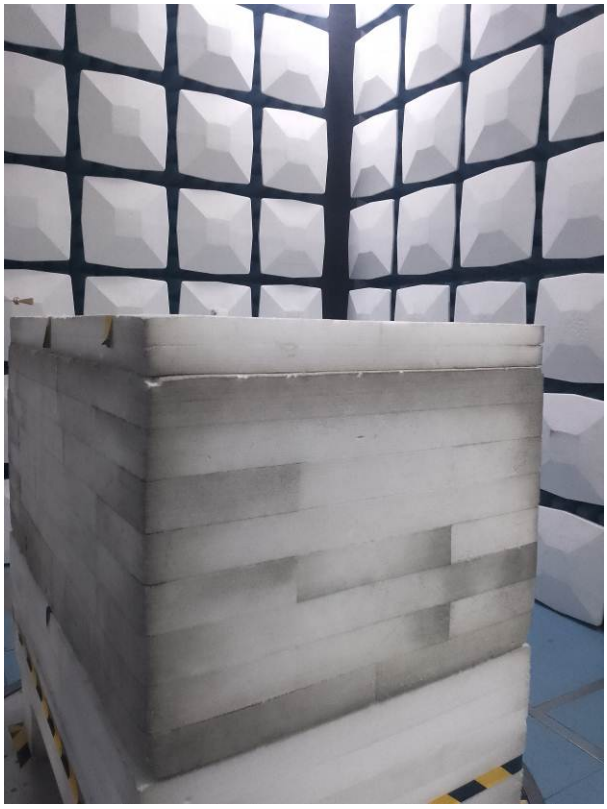
RE Below 1GHz View 26.5-40GHz

RE Below 1GHz View 40-60GHz



RE Below 1GHz View 60-90GHz

RE Below 1GHz View Above 90GHz



*******END OF REPORT*******